

THE INDIAN CADDIS FLIES (*TRICHOPTERA*).

BY

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(With twelve plates).

PART VI.

(Continued from page 496 of Volume XI, 1938).

SERICOSTOMATIDAE (Cont.)

Thremminae Martynov.

Thremminae Mart., Trav. Inst. Zool. Ac. Sci., U.R.S.S., 12, pp. 386-387, 1933.

Ocelli present; maxillary palpi of the ♂ either one- two- or three-jointed; discoidal cell present in the anterior wing, absent in the posterior in the known Indian species. Insects generally blackish.

Only one genus, *Eothremma*, is at present known to occur in India.

The *Thremminae* is the only sub-family in the Sericostomatidae in which ocelli are present.

Eothremma Martynov.

Eothremma Mart., Annot. Zool. Japon., 14, p. 150, 1933.

Spurs 1, 3, 4; maxillary palpi ♂, single- or two-jointed, terminal joint sometimes obscure; in the wings, discoidal cell present in the anterior, absent in the posterior; genitalia ♂ with generally a pair of oval superior appendages and a wide ventral plate bearing numerous, upturned teeth;

Genotype: *Eothremma japonica* Mart.

Eothremma parva sp. n. Pl. I. Figs. 1-5.

Insect small and black. Maxillary palpi ♂, single-jointed, the joint being exceptionally short.

Genitalia ♂.—Superior appendages very large, clavate at their apices; ninth tergite, from above, obsolete; in the cavity is a pair of downwardly directed processes, possibly strongly chitinized productions of the lateral angles of a membranous dorsal plate; the apices of these processes are slightly inturned; between them is a forked process, the forks appearing as plates set edgewise; penis short, slender and rod-like; ventral plate rectangular, armed with short, peg-like teeth.

Length of the anterior wing ♂ 8 mm.

N.-E. Burma: Kambaiti, 6,800 ft., 9-iv-1934. R. Malaise.

Type ♂ in the collection of the Stockholm Museum. A ♂ paratype in the British Museum collection.

Eothremma burmana sp. n. Pl. 2. Figs. 1-8. Pl. 3. Figs. 1-3.

Insect dark walnut-brown; anterior wing with a broad, short discoidal cell; maxillary palpi in the ♂ varying in form in individuals, one- or two-jointed, basal joint large and dilated, terminal joint slender, sometimes very inconspicuous and scarcely to be made out in the dried examples; in the ♀, the maxillary palpi are unusually short, measuring only 0.86 mm. against a width of head and oculi of 1.46 mm.; only two ocelli present.

Genitalia ♂.—The ninth tergite from above, slightly depressed and produced in a pair of broad plates, somewhat penthouse in shape with the upper edges slightly overlapping; superior appendages very large, rounded at their apices and slightly constricted at their bases; the other parts of the genitalia are obscure; penis slender accompanied by a pair of sinuous and strongly chitinized sheaths; ventral plate rectangular, armed with short teeth along its apical margin.

Genitalia ♀.—The abdomen terminates in a triangular dorsal plate. There is a large vulvar scale of which the middle lobe is broad and the side lobes terminate in acute points; above the scale is a plate which is excised at the centre of its apical margin.

Length of the anterior wing ♂ 10 mm.; ♀ 12 mm.

N.-E. Burma: Kambaiti, iv-vi-1934, R. Malaise.

Type ♂ in the collection of the Stockholm Museum. Numerous paratypes ♂ and ♀ in the collections of the Stockholm and British Museums.

This species presents the very unusual character of a varying number of joints to the male maxillary palpus. In some examples there are very definitely two though the second may be reduced to a mere tubercle. In others, there is a single, cylindrical joint. The neuration is also subject to variation, fork no. 3 having a short footstalk in some examples and being sessile in others. I have been unable to find a sufficient variation in the form of the genitalia to warrant the erection of separate species but figures of the wings and palpi from additional examples are here shown.

Eothremma hindustana Martynov. Pl. 3. Fig. 4.

Eothremma hindustana Mart., Rec. Ind. Mus., 38, pp. 296-7, Fig. 69, 1936.

Martynov describes the species as follows:—

'Head blackish-brown, with distinct ocelli, behind which and the eyes are seen pale yellow stripes. Basal joint of the antennae brownish, second very short, next two joints elongated, yellow. Thorax dark brown, portion of membrane uniting separate sclerites, pale; coxae brown, legs brownish-yellow. Anterior wing pale brownish, with brownish venation; venation resembling that of *Eothremma japonica* Mart., but discoidal and thyridial cells are longer, fork 3 pedicellate and CuA in its end portion is dark towards M₃. In posterior wings, M divides a little earlier than the division of Rs, crossvein rs-m longer, fork 5 is very short in *E. hindustana*; abdomen brown, but three posterior segments yellow above.

'Length of body 5.5 mm.

'Remarks.—Judging by the wing venation, *E. hindustana* is evidently similar and allied to *E. japonica* Mart. from Japan. *Thremminae* is a relict sub-family with few genera and species; its representatives are very rare; therefore the discovery in North India of the second species of *Eothremma* is very interesting; similar geographical distribution is met with in the genus, *Limnocentropus* Ulm. (*Phryganeidae*).

'♀ Punjab, Punj-pul Nullah, about a couple of miles from Dalhousie-Bakloh Road, 6,500 ft., v.27, S. L. Hora.'

Type ♀ in the Calcutta Museum.

***Eothremma laga* sp. n. Pl. 4. Figs. 1-7.**

The examples before me were both collected in fluid and subsequently mounted in balsam; I am unable, in consequence, to give any indication as to the general appearance of this insect. Antennae, basal joint, about as long as the breadth of the head, next joint not much more than half the length of each of the following joints; maxillary palpi with a microscopic terminal joint; labial palpi very long; both wings have a narrow, yellow, chitinized groove at the base between the subcosta and the base of the radius which, in both wings, is somewhat thickened; in the anterior wing, fork no. 1 very narrow, with a short footstalk.

Genitalia ♂.—Margin of the ninth tergite straight; projecting beyond it is a slender, arching process with a narrow stem and bifid apex which is dilated both from above and the side; this may be the upper portion of an upper penis-cover; superior appendages strong, caliper-shaped, somewhat dilated at the apices as seen from the side; the lower portion of the upper penis-cover is in the form of a pair of wide, blackened, down-curved hooks; penis narrow and sinuous, only visible in a cleared example; inferior appendages very small and round; there is a wide, shallow, rectangular ventral plate with a strongly fringed and shallowly excised apical margin, with the inner surface set with short, peg-like spines.

Length of the anterior wing ♂ 5 mm.

Kashmir: Gagabal. 12,000 ft. F. J. Mitchell.

Type ♂ and paratype ♂ in the author's collection.

***Eothremma punja* sp. n. Pl. 5. Figs. 1-5.**

The type and paratype of this species are both preserved in balsam so that a description of the general appearance of the insect is not possible.

Ocelli present; maxillary palpi single-jointed, the joint broader at its base than at its apex, carrying on its upper surface a mass of very stiff bristles; labial palpi, joints nearly equal in length, middle joint the shortest of the three; wings; the balsam in which the insects are mounted has rendered the neuration very indistinct, particularly in the posterior wing where it is too obscure for figuring.

Genitalia ♂.—The ninth dorsal segment is widely excised at its apical margin and there is a raised upper part, also with an

excised margin and with the lateral apical angles slightly produced to form outstanding spurs; set in the centre of the excision is a pair of broad, vertical plates with much blackened apices; on each side of these plates is a stout superior appendage, broad and incurving from above and with a rounded, dilated apex from the side; penis somewhat bulbous at the base, narrowing to a rod-like apical part; from beneath, there is a somewhat rectangular ventral plate, the upper surface set with short stout spines, apex widely excised; inferior appendages very small and narrow, lying along the ventral margin of the ninth segment and directed inwards; ninth segment slightly produced at its centre.

Length of anterior wing ♂ 4.5 mm.

India: Punjab, Chotah, Bagahal, trib. R. Uhl. G. C. L. Howell.

Type and paratype ♂ in the author's collection.

Helicopsychinae Ulmer.

Helicopsychinae Ulmer, Bernstein, Beitr. Naturk. Preussen, 10, p. 304, 1912.

Spurs 1, 2, 2, or 1, 2, 4, or 2, 2, 4. Ocelli absent; maxillary palpi of the ♂ two- or three-jointed; basal joint, where three are present, very small; wings long and narrow, densely pubescent; in the anterior, discoidal cell present; posterior, forks nos. 4 and 5 generally present; discoidal cell wanting.

Only one genus, *Helicopsyche*, has been found as yet in India.

Helicopsyche Hagen.

Helicopsyche Hagen, Ent. Mon. Mag., 2, pp. 252-3, 1866.

McLach., Rev. & Syn. Trich., pp. 268-9, 1876.

Spurs 1, 2, 4 or 2, 2, 4. Antennae with the basal joints stout and with a pair of rounded, hinged plates between them at their junction with the head; maxillary palpi ♂, two-jointed, joints about equal in length; wings narrow, acute at their apices; neuration differing according to species; in the posterior wing, fork no. 4 generally present; costal margin bearing a row of small hooks; genitalia ♂, dorsal plate large; inferior appendages large, dilated and directed upwards; in both sexes, there is a ventral process to the sixth segment; the third, fourth, fifth, sometimes only the third and fourth sternites reticulated on their surfaces.

Genotype: *Helicopsyche borealis* Hagen.

I am unable to find the second and minute spur mentioned by McLachlan as pertaining to the anterior leg. In the Indian species here described, microscope preparations indicate that there is only one; the preparations also show that the ventral process is situated on the sixth and not on the seventh sternite as stated in McLachlan's Revisional Monograph. I cannot find, moreover, more than two joints in the ♂ maxillary palpi as against three, stated by McLachlan to be present in the European species.

The larvae of species in the genus are remarkable for their spiral and heliciform cases, constructed of sand and small stones. These were at first considered to be the shells of small fresh-water *Mollusca* and it was only in 1843 that their Trichopterous nature was first suspected.

Helicopsyche ceylanica Brauer.

Helicopsyche ceylanica Brauer, Reise Novara, Neur., p. 26, 1866.

Brauer's description is confined to an account of the larva and case. There is no mention of the adult form.

Helicopsyche minuta sp. n. Pl. 6. Figs. 1-7.

Insect small, wings clothed with widely separated, coarse hairs. In the ♂, anterior wing narrow and acute, with the discoidal cell doubtfully closed; posterior wing narrower than the anterior, with a very acute apex; spurs 1, 2, 4.

Genitalia ♂.—Dorsal plate large, widely cleft at its truncate apex, lateral angles produced in short spurs; a pair of short, slender appendages arising from the sides at the base; from the side, the dorsal plate is stout, arching downward; penis large and membranous with a pair of slender sheaths; inferior appendages very large and black; from the side, with slightly dilated apex, a short spur arising on the lower margin near the base; from beneath, inner margin serrate; there is a pair of long, slender branches arising from the base of the appendages between the two, apices slightly divergent; ventral process very small.

Genitalia ♀.—From above, there is a pair of raised, triangular ridges, narrowing to sub-acute, blackened apices; beneath is a rounded plate with a small excision at the centre of the apical margin; a small process to the sixth sternite.

Length of the anterior wing ♂ 4 mm.; ♀ 4.5 mm.

N.-E. Burma: Kambaiti, 30-iv-1934.

Type ♂ in the collection of the Stockholm Museum; paratypes ♂ and ♀ in the Stockholm and British Museum collections.

Helicopsyche martynovi sp. n. Pl. 7. Figs. 1-5.

Insect small, yellowish. Neuration towards the base of the posterior wing, irregular, with no apparent fork no. 5; spurs 1, 2, 4.

Genitalia ♂.—Ninth tergite produced in a long, rectangular plate with a deeply excised apex, each lateral angle bearing a pair of bristles; there is also a bristle on the upper surface on each side of the excision; at the base, on each side, is a slender appendage, seen from above, and with a clavate apex from the side; penis concealed, no apparent sheaths; inferior appendages claw-shaped with an excision on the lower margin towards the apex as seen from the side; from beneath, the lower margin overlaps the upper to make a fold in which is seen a pair of small processes, each armed at its apex with a bristle; a strong process to the sixth sternite.

Genitalia ♀.—The apex of the abdomen from above, terminates in a pair of parallel, finger-like processes, widely separated, with the surface of the tergite on each side strongly reticulated.

Length of the anterior wing ♂ 4 mm.; ♀ 5.5 mm.

Tenasserim: Mekane, gokm. East of Moulmein, 200 m. 2-8-xi-1934, R. Malaise.

Type ♂ in the Stockholm Museum collection. ♂ and ♀ paratype in the British Museum collection.

I dedicate this species to the memory of the late A. B. Martynov whose recent papers on the Trichoptera in the Calcutta Museum are of the greatest value and are outstanding examples of careful work.

Helicopsyche maculata sp. n. Pl. 8. Figs. 1-5.

This is a small, dark insect with narrow, brown wings, the anterior bearing a pale spot on its lower margin near the arculus; no apparent fork no. 5 to the posterior; head and thorax very dark brown; antennae dark brown, basal joint about the same length as a joint of the maxillary palpi, second joint small, remaining joints longer than the second; a small, rounded lobe arising from the head near the attachment of the basal joint on the inner side; ocelli wanting; maxillary palpi two-jointed, joints about the same length labial palpi three-jointed, all the joints short and approximately equal in length; spurs 1, 2, 4; tarsi and tibiae of the median, and tarsi only of the posterior legs bearing short, black spines.

Genitalia ♂.—Ninth tergite produced in a long, rectangular plate with an excised apical margin, the excision beginning at the apical angles so that a pair of triangular forks is formed; beneath this is a membranous penis with a pair of long, fine, caliper-shaped sheaths; inferior appendages furcate, basal fork short, situated ventrally, triangular from beneath with a produced apex, directed distally; second fork large, directed upward from the side, apex curving distally, outer margin produced towards its centre in an irregularly shaped mass; the lateral angles of the ninth segment are produced in small, irregular knobs; a large process to the sixth ventral segment.

Length of the anterior wing ♂ 4.5 mm.

Palnis: 7,000 ft. Kodaikanal Shola, 16-viii-1921, Fletcher Coll.

Type ♂ in the collection of the British Museum.

Helicopsyche shaunga sp. n. Pl. 9. Figs. 1-5.

Insect small and yellowish; basal joint of the antenna about half the width of the head with the oculi; maxillary palpi two-jointed, basal joint broad and slightly curved, terminal joint very small; labial palpi three-jointed, basal joint long and broad, twice the length of the second, third joint microscopic; wings with the neuration abnormal or aberrant in the single example before me; apical forks nos. 1, 4 and 5 in the anterior, only 3 and 5 in the posterior. The species is thus exceptional in lacking fork no. 4 in the posterior wing. Spurs, 1, 2, 4.

Genitalia ♂.—Ninth tergite forming a long plate arising from a broad base and produced to a narrower, truncate apex, slightly excised at the centre of its apical margin; it bears a few short, stout bristles on its upper surface towards the apex; the appendages of the plate small, arising from narrow stems, apices

clavate; from the side, situated midway and towards the margin of the segment; penis concealed; lower penis-cover broad, with an excised apex and perhaps bearing a ventral ridge at the base of which are two short, rod-like spurs, slightly diverging from each other; inferior appendages large, apices clavate, arising from narrow stems, lower and inner margins set with short, peg-like teeth; the surface of the third, fourth and fifth sternites reticulated.

Length of the anterior wing ♂ 4 mm.

Burma, ca. 200m. Washaung, 20km. East of Myitkyina, 14-vii-1934, R. Malaise.

Type ♂ in the collection of the Stockholm Museum.

The following genera, *Ashmira*, *Gastrocentrides* and *Noleka* have not been placed in any of the established subfamilies. When further knowledge of the Indian Sericostomatidae has been obtained, new sub-families will doubtless indicate themselves along natural lines to take these genera.

Ashmira gen. nov.

Spurs, 2, 4, 3. Forks 1, 2, 3 and 5 present in both wings in both sexes; discoidal cell in anterior wing long and narrow, in the posterior, shorter and broader, particularly towards the distal end. Other details in the description of the single species *elia*.

Genotype: *Ashmira elia* sp. nov.

Ashmira elia sp. nov. Pl. 10. Figs. 1-9.

Head black; oculi bronze; antennae dark fuscous with very faintly indicated, slightly paler annulations; basal joint large with a short acute tongue arising at the apical margin to engage with a narrow excision of the second joint; this joint is very short, third joint more than twice the length of the second, other joints slightly longer than the second; palpi fuscous, maxillary with the basal joint shorter than the second, first and second joints globular, third small and slender, legs fuscous, spurs 2, 4, 3; wings dark fuscous with short, close, fuscous, nearly black pubescence.

Genitalia ♂.—Dorsal margin of the ninth segment widely excised; in the centre of the excision are the superior appendages, set very close together, slightly dilated before the sub-acute apices, and, in one example, with serrated lateral margins; beneath them is an upper penis-cover varying considerably in form in individuals; it is roughly triangular with a pair of strongly chitinised processes arising at the centre of its basal margin; in one example these processes are small, in another nearly as long as the triangular cover and with serrate or sinuous lateral margins; arising from beyond or between their apices is a pair of finger-like membranous processes projecting beyond the excised apex of the cover, each apical angle slightly produced and often there are small wart-like projections along the lateral margins; penis with a slender stem and furcate apex; inferior appendages branched; upper branch terminating in a rounded, membranous apex, seen from above; obliquely truncate from the side; below this branch is a strongly

chitinised second branch, apex from above and beneath, acute and directed inwards, lower branch from beneath, very stout and also terminating in a membranous, rounded apex; from the side, there is a wide rounded excision between the upper and lower branches, the second branch long and somewhat rectangular, arising at the centre of the excision, directed tailward.

Genitalia ♀.—From above, the last segment terminates in two triangular plates which cover a membranous plate, the apex of which is turned slightly over; terminal ventral segment produced in a rectangular plate.

Length of anterior wing ♂ 7.5 mm.; ♀ 9 mm.

Kashmir: Arrah Riv., 4-v-1925, F. J. Mitchell; Gulmarg: 15-vi-1931, Fletcher Coll.

Type ♂, a microscope preparation, (Arrah Riv.) in the author's collection; paratypes ♂ and ♀ in the author's and the British Museum collections.

Gastrocentrides Ulmer.

Gastrocentrides Ulm., Treubia, xl, pp. 475-6, 1930.

According to Ulmer, the maxillary palpi ♂ should be three-jointed. His figure of the genotype, *sumatrana*, only indicates two joints and I am unable to find more than this number in the single species present amongst the Indian material. He also gives the spurs as 2, 4, 4 whereas, in the single Indian species they are unquestionably 1, 4, 4. Anterior wings with forks nos. 1, 2, 3 and 5, posterior nos. 1, 2 and 3; neuration alike in both sexes; ventral processes in both sexes to the sixth sternite.

Genotype: *G. sumatrana* Ulmer.

Gastrocentrides evansi sp. n. Pl. II. Figs. 1-5.

Insect small and yellowish. Maxillary palpi ♂ two-jointed, joints equal in length, the terminal with a branch arising towards the base, closely applied on the upper surface; labial palpi with a small basal joint, second twice as long, third, twice as long as the second.

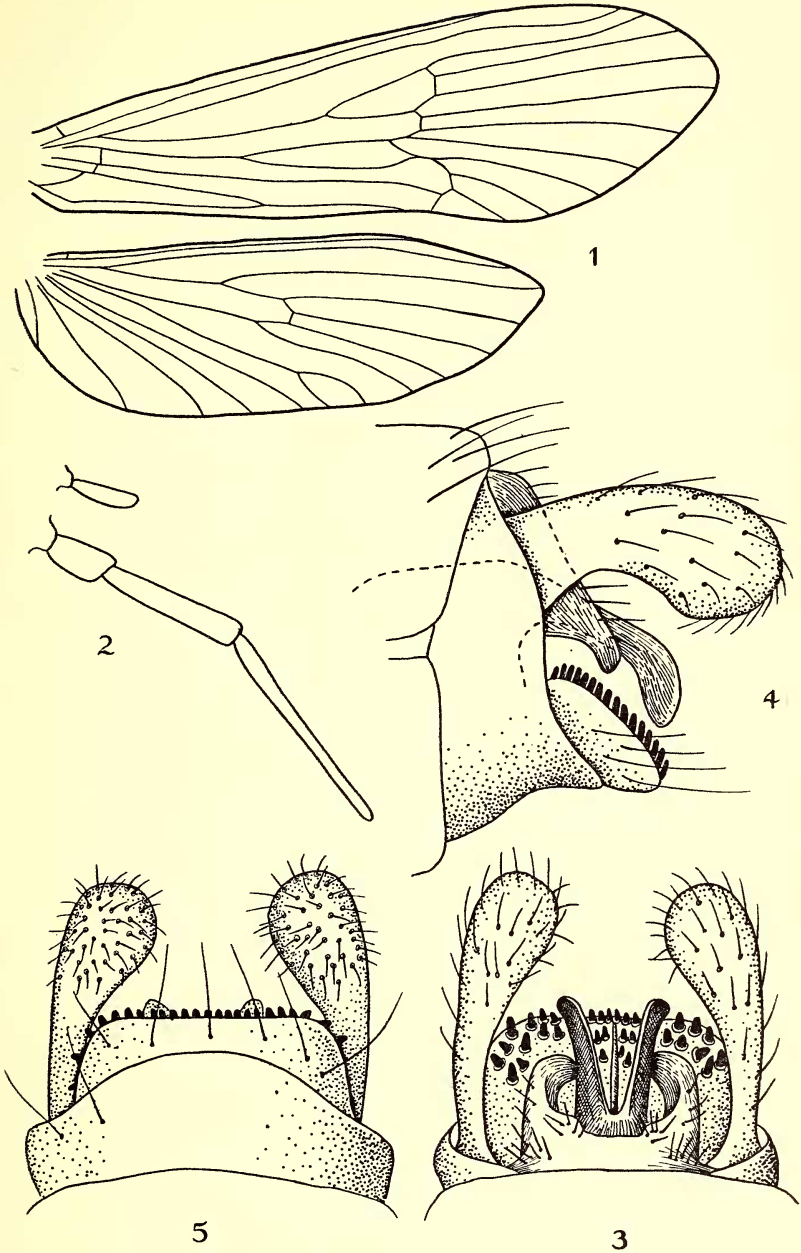
Genitalia ♂.—Superior appendages narrow from above, inclining slightly inwards, rounded from the side; dorsal plate very large, deep from the side; penis obscured by other parts of the genitalia; inferior appendages very broad, particularly from the side, with the apices turned outwards, lateral margins sinuous from beneath; apical margin of the ninth sternite produced at its centre to form a process when seen from the side; a very strong process to the sixth sternite.

♀.—The neuration will enable the ♀ to be easily recognised, differing in no great respect from that of the ♂. As in this sex, there is a process to the sixth sternite.

Length of the anterior wing ♂ 4 mm.; ♀ 6 mm.

N. Burma. Myitkyima, 175 m., 1-14-iii-1934; Washaung, 20km. East of Myitkyima, 16-iii-1934; 14-vii-1934, R. Malaise.

Type ♂ in the collection of the Stockholm Museum. Paratypes ♂ and ♀ in the Stockholm and the British Museum collections.



Eothremma parva sp. n., ♂.—Fig. 1, wings. Fig. 2, palpi. Fig. 3, genitalia, dorsal. Fig. 4, lateral. Fig. 5, ventral.